NOVEL LOW DIMENSIONAL MATERIALS

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Education:

The emphasis of our research is on interdisciplinary studies and international cooperation. The graduate students in the high pressure group are expected to do research in laboratories of collaborators and interact with graduate students visiting here to work and receive training in the high pressure lab at the Department of Physics at CSU.

Alexander Osadchy (on leave from Natural Sciences Center of General Physics Institute, Moscow, Russia), Christian Graf (Fochhochschule Deggendorf Mechanical Engineering Department), Prof. Yukikuni Akishige, (on leave from Shimane University, Matsue, Japan), Segey Terekhov (on leave from Natural Sciences Center of General Physics Institute, Moscow, Russia), Ana Kanevce, Hans Dieter Hochheimer, Caleb Blissett, Ignacio Hernandez (on leave from DCITIMAC, Univerity of Cantabria, Santander,Spain)
(from left to right)

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We have synthesized novel one- and two- dimensional materials to study the influence of dimensionality on the physical properties of these materials. The application of high pressure can change the dimensionality which in turn leads to interesting electronic effects.[1,2]

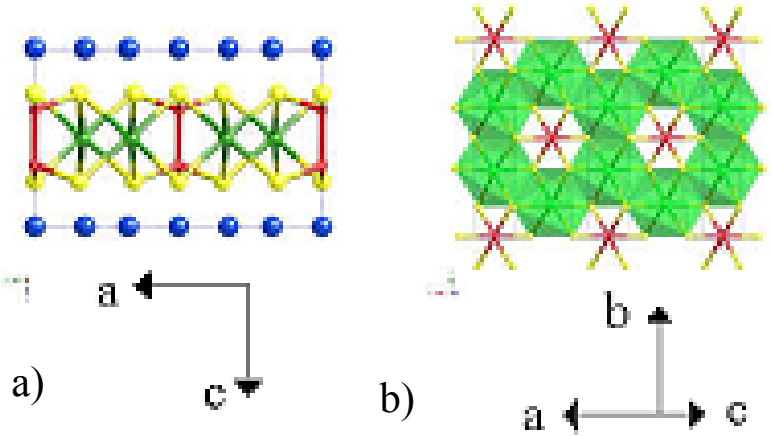

Fig. 1. Na8Eu2(Si2Se6)2 a) viewed parallel to b-axis b) viewed perpendicular to the Eu2(Si2Se6)8- layers, Na sites are omitted for clarity. Na sites are shaded blue, Eu green, Si red, Se yellow

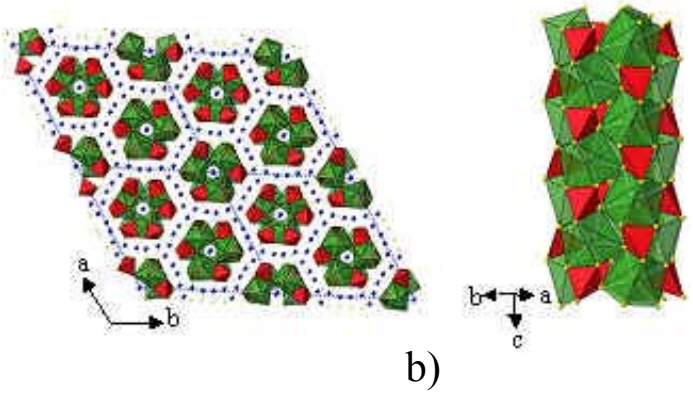

Fig 2. NaEuGeS4 viewed a) along the c-axis, and b) perpendicular to EuGeS4 channels. Red polyhedra are GeS44- units, green polyhedra are EuS7 units, blue spheres are Na atoms, yellow spheres are S atoms.

1. B. Lorentz, I. Orgzall, P. K. Dorhout, C. C. Raymand, K. Brester, K. Weeshaupt, R. D' Adamo, H. D. Hochheimer, "High Pressure X-ray diffraction, absorption, luminescence, and Raman scattering study of Cs_2MoS_4" Phys. Rev. B **55**, 2800 (1997)

2. I. Orgzall, B. Lorenz, P. K. Dorhout, P.M. Van Calcar, K. Brister, T. Sander, H. D. Hochheimer, "High pressure optical and X-ray diffraction study of two polymorphs of $K(RE)P_2Se_6$ (Re = Pr and Tb)' J. Phys. Chem. Solids, **61**, 123 (2000)